JAPAN

EDICT OF GOVERNMENT

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JIS A 5759 (1988) (English): Adhesive films for glazings

安 *The citizens of a nation must honor the laws of the land.* 倂

Fukuzawa Yukichi

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JAPANESE INDUSTRIAL STANDARD

Adhesive Films for Glazings

JIS A 5759—1988

Translated and Published

by

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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JAPANESE INDUSTRIAL STANDARD J I S

Adhesive Films for Glazings A 5759-1988

1. Scope

This Japanese Industrial Standard specifies the films for shielding solar radiation to be affixed to window panes in offices, shops, houses, etc., hereinafter referred to as the "buildings" to heighten the cooling and heating efficiency in the interior; the films for glass scattering prevention as a means of helping alleviate the impact of the scattering and dropping window panes in the buildings in the event of collision, earthquake and explosion; and the films for the double purposes of solar radiation shielding and glass scattering prevention, hereinafter all of these to be referred to as the "films".

Remarks 1. The units and numerical values given in { } in this Standard are based on the traditional unit system and are appended for informative reference.

2. Window panes herein mentioned do not include organic glasses.

2. Definitions

For the purpose of this Standard, the following definitions of main terms apply.

(1) solar radiation Part of the evergy irradiated by the sun as electromagnetic waves that has reached the earth (refer to Table 7).

(2) visible light Radiation capable of exciting to visual sense through the visual organ. In general, the limit in short wavelength in the wavelength range of visible light is 380 to 400 nm and the limit in the long wavelength is 760 to 780 nm.

(3) transmittance The ratio (Φ_s/Φ_i) of light flux of transmitted light (Φ_s) and light flux of incoming light (Φ_i). The symbol of quantity of transmittance is τ to be represented by percentage (%).

Further, transmission means a phenomenon in which light passes through a medium without changing the frequency of its monochromatic light component.

(4) reflectance The ratio (Φ_r/Φ_i) of light flux of reflected light (Φ_r) and light flux of incoming light (Φ_i). Its quantity symbol is ρ to be represented by percentage (%).

Further, reflection means a phenomenon in which light, as it enters the boundary surface of a medium, returns to the incoming side without changing the frequency of its monochromatic light component.

Applicable Standards and Reference Standard: See page 16.

(5) shielding coefficient Coefficient of passage of solar radiation having reached the plate glass 3 mm in thickness with film affixed, the portion of passage including the portion absorbed once and reradiated to the side opposite the incoming side (that is the portion of passage is the sum of transmitted portion and reradiated portion), represented by taking the ratio in the case of plain plate glass as 1.

(6) overall heat transfer coefficient Amount of heat passing per 1 m^2 in 1 h through plate glass 3 mm in thickness with film affixed under the condition that the side with film affixed is taken as the high temperature side and the difference of temperature in between the two sides is 1 °C.

(7) plate glass Float plate glasses specified in JIS R 3202.

3. Classification

The films shall be classified into 3 classes, the film for prevention of scattering of solar radiation shielding-glass, the film for glass scattering prevent and the film for solar radiation shielding, and they shall further be divided, as given in Table 1, into the use for inside affixing and the use for outside according as the films are affixed inside or outside a building.

Table 1. Classification and Symbols of Films

Classification	Name	for inside affixing	for outside affixing
Class 1	Films for solar radiation shielding and glass scattering prevention	1 - I	1 - II
Class 2	Films for glass scattering prevention	2 - I	2 - II
Class 3	Films for solar radiation shielding	3 - I	3 - II

4. Quality

4.1 General Performance The films shall, in general, possess the characteristics of transparency, uniformity, toughness, flexibility and stability of dimensions against the change of temperature and humidity and shall meet each of the following requirements.

(1) When tested according to 5.2.3, there shall be no stains, bubbles, striae, etc. liable to hinder the penetrative view through the films.

(2) The films affixed to window panes shall not damage or corrode them.

(3) The films having been affixed to window panes shall adhere uniformly and be readily peeled off as necessary.

4.2 Optical Performance The optical performance of films having been tested according to the test methods specified in 5.3 shall meet the values given in Table 2, Table 3 and Table 4.

Table 2. Visible Ray Transmittance through Films

Indicating symbol	Class 1 and Class 3	Test method
A1	60 % and over	5.3.3
A2	30 % to 60 % excl.	
A3	10 % to 30 % excl.	

Table 3. Shielding Coefficient of Films

Indicating symbol	Class 1 and Class 3	Test method
B1	Under 0.4	5.3.4
B2	0.4 % to 0.6 % excl.	
B3	0.6 % to 0.7 % excl.	

Table 4. Overall Heat Transfer Coefficient

Unit: W/m²K {kcal/m²h℃}

Indicating symbol	Class 1 and Class 3	Test method
C1	Under 5.1 {Under 4.4}	5.3.5
C2	5.1 to 5.9 excl. {4.4 to 5.1 excl.}	

4.3 Physical Performance The physical performance of films having been tested by the test methods specified in 5.4 shall meet the values of Table 5.

Table 5. Physical Performance of Films

	Class 1	Class 2	Class 3	Test method
Tensile strength N/10 mm width {kgf/10 mm width}	40 min. {4.1 min.}	40 min. {4.1 min.}	20 min. {2.0 min.}	5.4.3
Elongation %	60 min.	60 min.	60 min.	5.4.3
Adhesive strength N/10 mm width {kgf/10 mm width}	1.6 min. {0.16 min.}	1.6 min. {0.16 min.}	–	5.4.4

4.4 Weather Resistance The weather resistance of films having been tested by the test methods specified in 5.5 shall meet each of the following requirements.

(1) There shall be no colour change of No. 3 or over of grey scale specified in JIS L 0804 or 3 or over in colour difference specified in JIS Z 8730.

(2) There shall be no abnormalities, such as blistering, crazing, peeling at the ends, etc.

(3) The visible ray transmittance shall meet the values given in Table 2.

(4) The tensile strength, elongation and adhesive strength shall meet the values given in Table 5.

4.5 Glass Scattering Prevention Performance When the test is conducted by method A specified in 5.6.1, the total mass of 10 largest broken pieces selected from among the scattered test pieces, shall not exceed 80 g and the mass of any single dropped piece shall not exceed 55 g.

Next, when the test is conducted by method B specified in 5.6.2, the glass scattering prevention ratio shall meet the values given in Table 6.

Table 6. Glass Scattering Prevention Ratio by Method B

Indicating symbol	Class 1 and Class 2	Test method
D1	95 % min.	5.6.2
D2	85 % min.	

5. Tests

5.1 Test Conditions The test shall be conducted, unless otherwise indicated, in a room of standard state (temperature 23 ± 2°C, relative humidity 65 ± 5 %).

5.2 General Performance Test

5.2.1 Preparation of Test Pieces As test piece A, affix to plate glass of size 1930 x 864 x 5 mm a film of 1906 x 840 mm at a distance of 12 mm from the side of the glass and prepare 4 pieces.

5.2.2 Pretreatment of Test Pieces Allow test pieces A to stand under normal temperature for 4 days or over.

5.2.3 Test Method Make the background into achromatic colour and observe visually test piece A at a distance of 90 cm under diffused illumination, in diffused daylight (1), under D_{65} standard light source specified in JIS Z 8720 or under standard light source specified in JIS Z 8902 to check for the existence of stain, bubble or striae.

Note (1) The diffused daylight means the diffused light of the indirect rays of the sun from 3 h after sunrise to 3 h before sunset.

5.3 Optical Performance Test

5.3.1 Preparation of Test Pieces Wash the plate glass 70 mm in width, 150 mm in length, 3 mm in thickness with water sufficiently, and affix to them the film of the identical dimensions to take as test piece B, preparing 3 pieces.

5.3.2 Pretreatment of Test Pieces Allow the test pieces B to stand in the standard state for 24 h or over.

5.3.3 Visible Ray Transmittance Test Measure the visible ray transmittance of B-pieces by either of the following two methods.

(1) Measure the spectral transmittance at 41 points of wavelength selected at an interval of wavelength 10 mm over the wavelength from 380 nm to 780 nm with a spectrophotometer and calculate from the following formula.

$$T_v = \frac{\sum_{380}^{780} P\lambda_i V\lambda_i T\lambda_i}{\sum_{380}^{780} P\lambda_i V\lambda_i} \times 100$$

where T_v : visible ray transmittance (%)

$P\lambda_i$: value of spectral distribution of standard light A

$V\lambda_i$: photopic vision standard spectral luminous efficiency in 2-degree visual field

$T\lambda_i$: spectral transmittance

However, as for the films of which distribution curve of spectral transmittance indicates a vibrational wave form, calculate the spectral transmittance at each wavelength from the mean distribution curve passing through the midway of crest and root.

(2) Combine a spectral luminous efficacy adjusting film with a photoelectric receiver of a transmittance meter so that the spectral sensitivity may approximately coincide with photopic vision standard spectral luminous efficiency ($V\lambda_i$) and thereby determine the spectral transmittance for standard light A.

5.3.4 Shielding Coefficient Test Measure the shielding coefficient of B-pieces by the following methods.

The values of spectral distribution of solar radiation to be used for calculation are shown in Table 7.

(a) Solar Radiation Transmittance Measure the spectral transmittance ($T\lambda_i$) at 36 points of wavelength set up at an internal of wavelength 50 nm over the wavelengths from 350 nm to 2100 nm with a spectrophotometer and calculate the solar radiation transmittance from the following formula or directly determine the solar radiation transmittance using a transmittance meter.

$$T_E = \frac{\sum_{350}^{2100} E\lambda_i T\lambda_i}{\sum_{350}^{2100} E\lambda_i} \times 100$$

where, T_E : solar radiation transmittance (%)

$E\lambda_i$: value of spectral distribution of solar radiation

$T\lambda_i$: spectral transmittance

However, in the case where a spectrophotometer is used, as for the films of which distribution curve of spectral transmittance indicates a vibrational waveform, calculate the spectral transmittance at each wavelength by the mean distribution curve passing through the midway of crest and root.

(b) solar Radiation Reflectance Measure the spectral reflectance ($R\lambda_i$) at 36 points of wavelength set up at interval of wavelength 50 nm over the wavelengths from 350 nm to 2100 nm with a spectrophotometer(2) and calculate the solar radiation reflectance from the following formula or directly determine the solar radiation reflectance using reflectance meter.

$$R_E = \frac{\sum_{350}^{2100} E\lambda_i R\lambda_i}{\sum_{350}^{2100} E\lambda_i} \times 100$$

where R_E : solar radiation reflectance (%)

$E\lambda_i$: value of spectral distribution of solar radiation

$R\lambda_i$: spectral reflectance

However, as for the films of which distribution curve of spectral reflectance indicates a vibrational waveform, calculate the spectral reflectance at each wavelength by the mean distribution curve passing through the midway of crest and root.

Note (2) At the time of measurement of $R\lambda_i$, attach the test piece inclining it by about 10 degrees so that the regularly reflected light may be caught in any integrating sphere.

(c) Determination of Long Wavelength Emissivity As for the long wavelength emissivity, cut a plate glass 3 mm in thickness to a size defined for the tester, wash with water sufficiently, then affix to it a film of an identical size and, using this stuff as a test piece, measure the emissivity of surface on the room side (ε_i) and emissivity on the outside of room (ε_0) by the method specified in 5. of JIS R 3106.

(d) Determination of Shielding Coefficient By means of solar radiation transmittance (T_E) and solar radiation reflectance (R_E), value of long wave emissivity of surface on the room side (ε_i) and value of long wave emissivity on the outside of room (ε_0), determine the shielding coefficient (S) from the following formulas.

$$S = \frac{T_E + N_i(100 - T_E - R_E)}{T_E^0 + 0.35(100 - T_E^0 - R_E^0)}$$

$$N_i = \frac{6.3\varepsilon_i + 4.1}{(6.3\varepsilon_i + 4.1) + (6.5\varepsilon_0 + 12.2)}$$

where, T_g^0 : solar radiation transmittance of plate glass in 3 mm in thickness

R_g^0 : solar radiation reflectance of plate glass in 3 mm in thickness

Table 7. Spectral Distribution of Solar Radiation ($E\lambda_i$)

Wavelength		Wavelength		Wavelength	
λ_i (nm)	$E\lambda_i$	λ_i (nm)	$E\lambda_i$	λ_i (nm)	$E\lambda_i$
350	1.27	950	3.29	1550	1.49
400	3.18	1000	4.25	1600	1.36
450	6.79	1050	3.72	1650	1.17
500	8.20	1100	1.70	1700	0.89
550	8.03	1150	1.46	1750	0.54
600	7.88	1200	2.52	1800	0.01
650	7.92	1250	2.21	1850	0.00
700	7.48	1300	1.78	1900	0.00
750	5.85	1350	0.12	1950	0.12
800	5.79	1400	0.00	2000	0.02
850	5.66	1450	0.16	2050	0.26
900	3.24	1500	1.06	2100	0.58
				Sum	100.00

5.3.5 Overall Heat Transfer Coefficient Test By means of ε_i and ε_0 determined in 5.3.4 (c), determine the overall heat transfer coefficient (K) from the following formula.

$$K\,(\mathrm{W/m^2K}) = \frac{1}{1/(4.9\varepsilon_0+16.3)+1/(5.4\varepsilon_i+4.1)+0.005}$$

5.4 Physical Performance Test

5.4.1 Preparation of Test Pieces

(1) C-Pieces As a test piece to be used for tensile test and elongation test, cut out a film 25 mm in width and 150 mm in length to take as C-piece, preparing 3 pieces.

(2) D-Pieces As a test piece to be used for adhesive strength test, affix to a plate glass cut 50 mm in width and 125 mm in length a film 10 mm in width and about 250 mm in length to take as D-piece, preparing 3 pieces. To be more precisely, carefully wipe the surface of plate glass with alcohol, etc., fix to one of its longitudinal ends the adhesive film with its adhesive surface down, cover the central portion of the glass with the film. Allowing the remaining 125 mm of the film to stay idle, apply powder of talc to it or cover it with paper. Next, move the pressurizing roller specified in JIS Z 0237 back and forth on the film at a speed of about 300 mm/min a trip to ensure tight adhesion.

Further, at the time of affixing the film, to help enhance adhesion, the surface of plate glass may preliminarily be wetted with water, etc..

5.4.2 Pretreatment of Test Pieces Allow C-pieces to stand in standard state for 24 h or over and D-pieces for 4 days or over.

5.4.3 Tensile Test and Elongation Test Fit C-piece to the tester specified in JIS B 7721, stretch it at a gripping distance 100 mm and drawing speed 300 ± 30 mm/min to measure the load (N){kgf} and elongation at the time of breaking and calculate the tensile strength and elongation from the following formula to obtain the mean value of 3 C-pieces.

$$T = \frac{P}{W}$$

where, T : tensile strength N/mm {kgf/mm}

P : maximum load at breaking N {kgf}

W : width of test piece (mm)

$$E = \frac{l - l_0}{l_0} \times 100\ (\%)$$

where, E : elongation

l_0 : initial gripping distance (mm)

l : gripping distance at breaking (mm)

Further, use a tester in which can afford to cover the antisipated measured values within the range from 15 to 85 % of its capacity.

5.4.4 Adhesive Strength Test Use the tester specified in 5.4.3. Turn up the idle portion of D-piece by 180°, peel about 25 mm, then fitting the film in the upper chuck and the plate glass in the lower chuck, proceed to peel at a rate of 300 ± 30 mm/min. In the case of a constant rate of traverse type tensile tester, remove the pawl to peel continuously and read out the force each time about 20 mm has been peeled, reading out 4 times in total. Conduct the test on 3 D-pieces and determine the mean value of 12 readings. In the case of a constant rate elongation type tensile tester, read out using recorded charts to determine the mean value of 3 pieces.

5.5 Weathering Resistance Test

5.5.1 Preparation of Test Pieces Take as test pieces 3 B-pieces used in 5.3.3 and allow to stand at ordinary temperature for one week or over.

5.5.2 Test Method Conduct the dew cycle accelerated weathering test on B-pieces using a dew cycle type sunshine carbon accelerated weathering tester under the conditions given in Table 8 and then conduct the following tests.

(1) Examine the change of colour using a grey scale or by measuring the colour difference by instrument.

(2) Visually examine the existence of blistering, crazing, peeling in the extremities, etc.

(3) Examine the change in visible ray transmittance by the method specified in 5.3.3.

(4) Cut out the film to the size 10 mm in width and 150 mm in length on plate glass, one piece from each sheet of glass, peel the film off the plate glass taking are not to give presure to the film, and test each according to the method specified in 5.4.3 to examine the change of tensile strength and elongation.

(5) Cut the film in the swath of 10 mm as it is affixed to the plate glass, test according to the method specified in 5.4.4 to examine the change of adhesive strength. However, after turned up by 180°, the length of the film to be peeled shall be about 50 mm.

5.6 Scattering Prevention Performance Tests The glass scattering prevention performance test of films shall be conducted by the following two methods (method A and method B). However, the test shall be conducted at ordinary temperature.

5.6.1 Method A (Impact Breaking Test)

(1) Preparation of Test Pieces As for a test piece, affix to a plate glass of size 1930 x 864 x 5 mm a film of 1906 x 840 mm avoiding the portion 12 mm inward from each edge of plate glass and take it as E-piece, preparing 4 pieces.

(2) Test Device A test device shall comprise the test table shown in Fig. 1 and the impact body shown in Fig. 3 as follows.

(a) Test Table Construct the test table as shown in Fig. 1, use shape steels as its main parts, fix to floor with bolts and for prevention of oscillation or strain at the time of impact, attach the supporting bars at the back. Construct the fastening frame to fix the four sides of E-piece as shown in Fig. 2, use neoprene, etc. in the portion contacting with E-piece, adjusting the fastening pressure not to exceed 25 % of thickness of neoprene.

(b) Impact Body As for the impact body, insert a bolt (330 ± 12 mm in length) in the centre of a leather bag or a rubber bag as shown in Fig. 3, fill it with lead case shots, then fasten the upper and lower sides of bag with bolts. Its mass shall be 45 kg ± 100 g.

Further, rigidly wind around the impact body a polyester fiber reinforcing adhesive tape 160 mm in length and 12.5 mm in width and others.

(3) Test Method Hang the impact body by wire 3 mm in diameter so that the impact body may be within 1.3 cm from the surface of E-piece and may not be separated by 5 cm or over from the center of E-piece and that the distance from supporting point to the point where the impact body and center of E-piece contact may be 152.4 cm as shown in Fig. 1. Next, hold the impact body at a point of dropping height 30 cm from central point of E-piece and then let it fall freely like a pendulum to impact against the central point of the test piece. In the case where E-piece did not scatter, take the height of 45 cm to test.

Conduct this test twice each on the side with film affixed and the side not affixed.

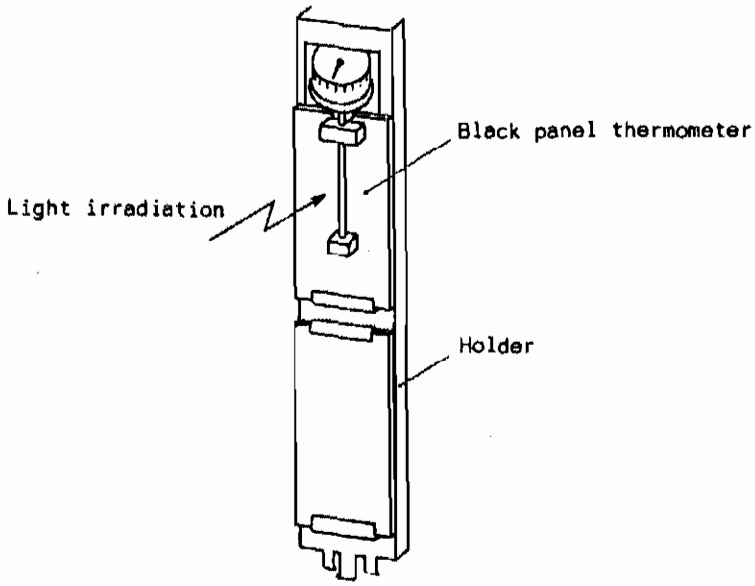
Table 8. Conditions of Dew Cycle Type Accelerated Weathering Test

Item	Condition
Light source	Sunshine carbon arc lamp, one (Construct 4 pairs of carbon in upper and lower, and use optical filter) Optical filter Spectral transmittance 2 % or under at 275 nm 90 % or over at 400 to 700 nm
Power source voltage	Single phase AC 180 to 230 V
Testing time (sum of nonirradiation and irradiation)	79 h and 12 min (It is preferable not to exchange carbon electrode, conducting the test continuously)
Conditions at the time of irradiation Mean discharge voltage and current Temperature to be indicated by black panel thermometer(3) Irradiance of test piece surface	 50 V ± 2 %, 60 A ± 2 % 63 ± 3°C 255 ± 45 W/m² (at 300 to 700 nm)
Conditions at putting out lights Air temperature Relative humidity Temperature of cooling water for glass surface	 30 °C 98 % and over About 7°C
Condition for cycle of putting out lights - irradiation	Putting out lights (dew, rain) 12 min - irradiation 60 min. Sum 72 min/cycle
Glass to affixed film to	Spectral transmittance 2 % or under at 275 nm 90 % or over at 400 to 700 nm
Conditions of light irradiation of affixed film(4)	Method A Case where the film is affixed on room side of window glass:Informative Reference Fig. 2 (a) Method B Case where the film is affixed on outside of room: Informative reference Fig. 2 (b)
Method of dew formation and cooling water spraying	Method A At the time of putting out lights, spray cooling water onto light irradiation surface (glass surface) to form dew. Method B At the time of putting out lights, spray cooling water onto light irradiation surface (surface with film affixed)

Notes (3) Attach the black panel thermometer with its painted surface turned directly toward light source as shown in Informative Reference Fig. 1.

(4) As for glass with film affixed, in the case of method A, attach the glass with glass surface on the side opposite the surface with film affixed turned toward light source as shown in Informative Reference Fig. 2 (a) and in the case of method B attach the glass with surface with film affixed turned toward light source as shown in Informative Reference Fig. 2 (b).

Informative Reference Fig. 1. Black Panel Thermometer



Informative Reference Fig. 2. Method of Irradiating the Affixed Film

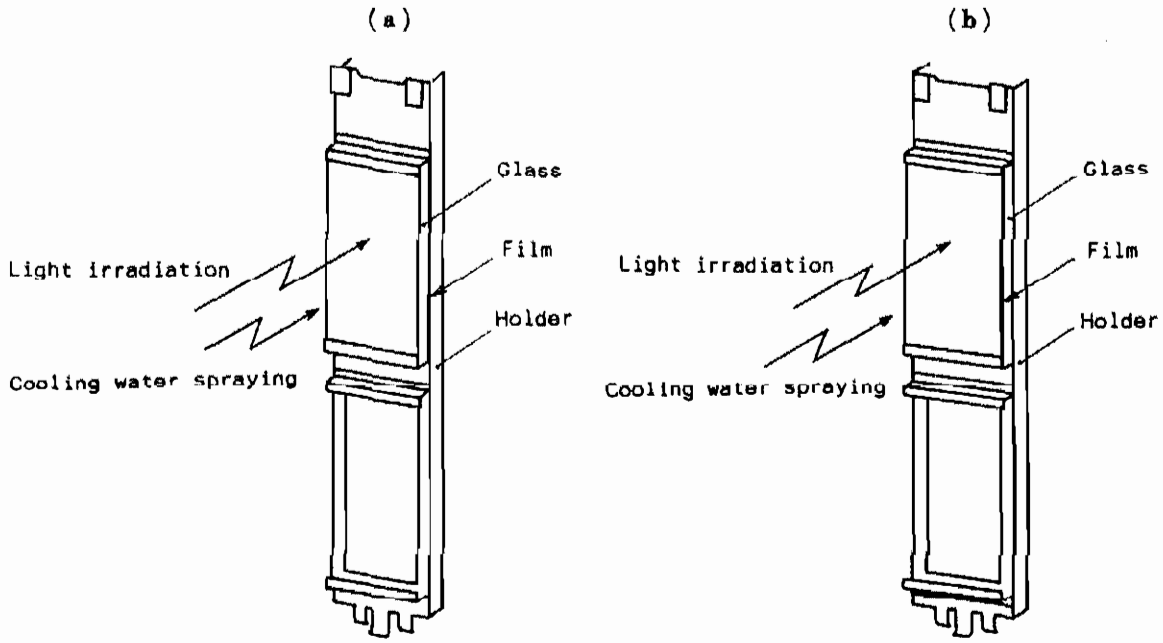
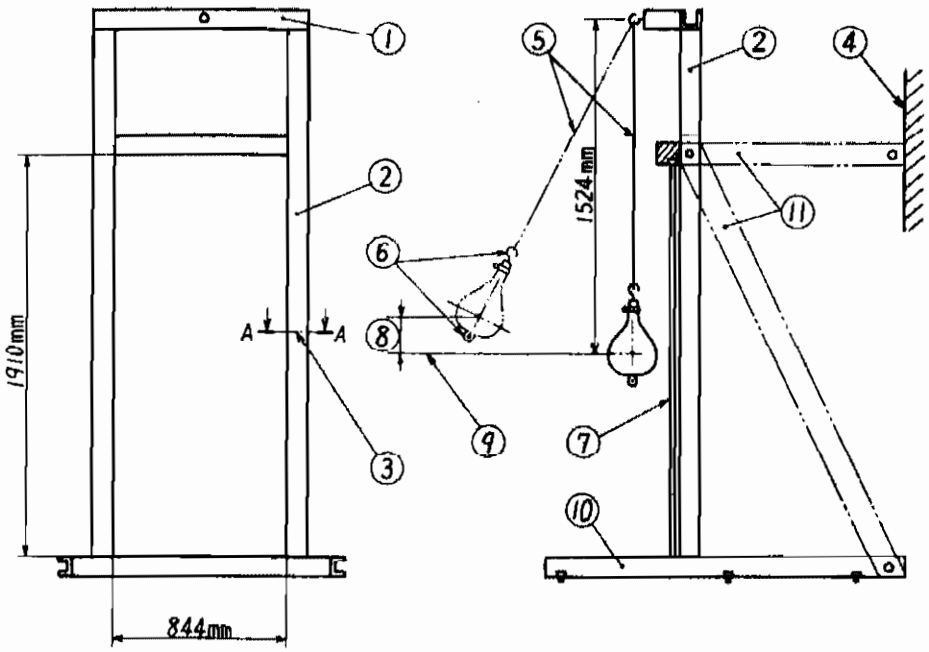
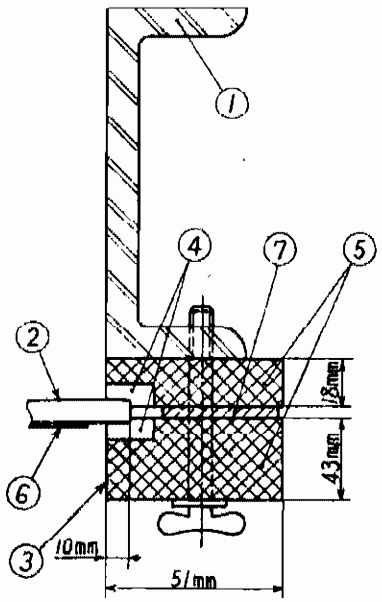


Fig. 1. Glass Scattering Prevention Performance Test Device (Method A)
(Left: front view Right: side view)



① Impact body hanger
② Test table frame
③ A A section
④ Concrete wall, etc.
⑤ Impact body hanging wire
⑥ Impact body
⑦ Test piece
⑧ Dropping height
⑨ Horizontal central line of test piece
⑩ Test table fixed to floor (fastened tightly with bolts)
⑪ Supporting bars

Fig. 2. Drawing of A-A Section of Test Table



① Shape steel (test table frame)

② Test piece (with film affixed 12 mm inside from edge of plate glass)

③ Fastening frame

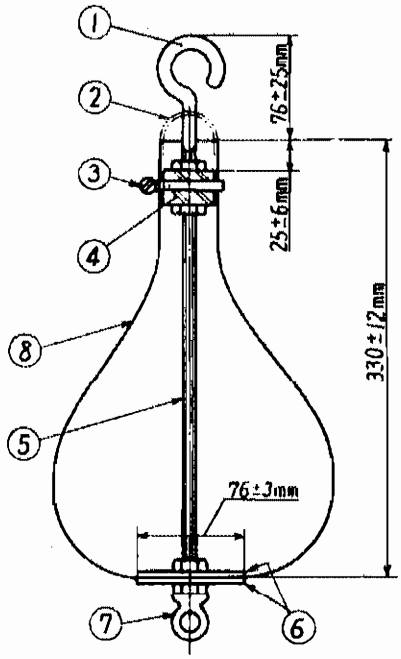
④ Chloroprene rubber piece

⑤ Wooden part

⑥ Film

⑦ Snap plate made of metal, etc.

Fig. 3. Impact Body



① Eye nut for hanging leather bag

② Hanging braid (to be removed afterward)

③ Clamp

④ Sleeve

⑤ Bolt

⑥ Washer

⑦ Eye nut (to hang wire to this to dray)

⑧ Leather bag

5.6.2 Method B (Interlayer Displacement Breaking Test)

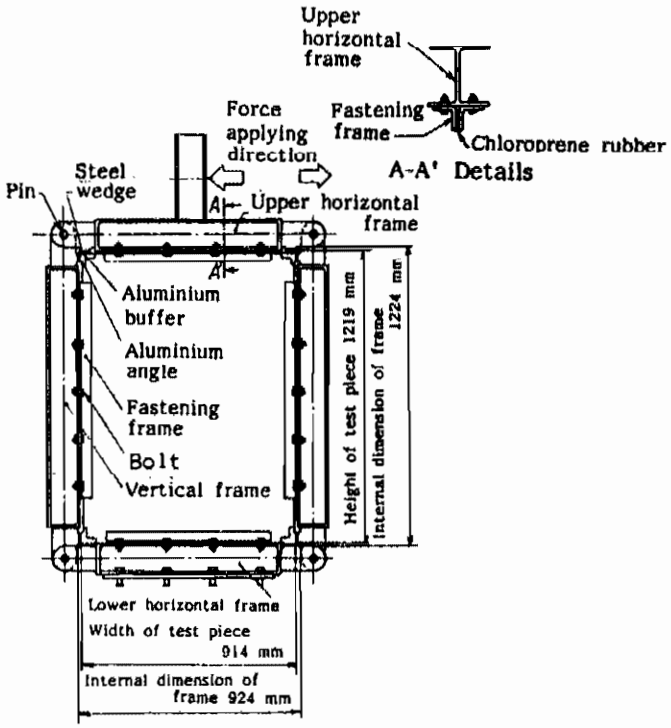
(1) Preparation of Test Pieces For test pieces, affix to plate glass 1219 x 914 x 5 mm a film 1215 x 910 mm about 2 mm each inside from each edge of plate glass to take as F-piece, preparing 4 pieces, and allow them to stand at ordinary temperature for 4 days or over.

(2) Test Device The test device shall consist of 4 steel frames with 4 corners connected by pins as shown in Fig. 4 and shall be equipped, at both ends of each frame, with a steel pressurizing plate 5 cm in width for transmitting displacement and force to corner parts of test piece (F-piece). The structure shall be capable of giving shearing deformation in surface to F-piece through the above pressurizing plate by the horizontal motion of the upper horizontal frame.

Further, the fastening frame to hold F-piece shall be reinforced by angles lined with chloroprene rubber and shall be fit to be fixed to each frame with bolts.

Moreover, the aluminium buffers 1 mm in thickness shall be used at every corner of F-piece in order to prevent local breaking.

Fig. 4. Glass Scattering Prevention Performance Test Device (Method B)



(3) Test Method Apply the following shearing deformation in surface to F-piece using the force applying device in Fig. 4. First, apply force from the state of deformed angle zero until the deformed angle in the positive direction reaches 1/60 rad and then decrease the force until the deformed angle returns to zero. Further, apply force until the deformed angle in the negative direction reaches 1/60 rad and then decrease force until the deformed angle returns to zero. Take the above two-way operation as the first cycle. Next, in the second cycle, taking the deformed angle as ± 1/30 rad, apply force in the same way as in the first cycle.

Further, take the deformation speed of applying and decreasing force as 1/20 to 1/7 rad/min.

At the completion of a deformation test, measure the mass of glass scattered from the test piece. Calculate the percentage to total mass of glass submitted to test from the following formula to determine the glass scattering prevention ratio (A).

$$A=\left(1-\frac{W}{W_0}\right)\times 100$$

where, A : glass scattering prevention ratio (%)

W_0 : mass of test piece before the test (g)

W : mass of glass scattered from test piece (g)

Conduct this test on 4 F-pieces to determine the mean value.

6. Inspection

The inspection shall be conducted on the quality and the results shall satisfy the specifications of 4.

7. Indication

The package of films finished in roll shall be indicated in a suitable place with the following items.

(1) Designation of product and its classification symbol as well as performance symbols

Examples: ① Solar radiation shielding - glass scattering prevention film for inside affixing (1-I, A3, B2, C2, D1)

② Glass scattering prevention film for outside affixing (2-II, D1)

③ Solar radiation shielding film for inside affixing (3-I, A3, B2, C2)

(2) Year and month of manufacture or its abbreviation.

(3) Manufacturer's name or its abbreviation.

8. Instruction Manual

The products shall be furnished with the instruction manual describing the following items.

(1) Items that require attension at affixing to window glass

Examples: ① "Because the affixing of Class 1 and Class 3 to wire glass or thermal ray absorption glass may cause a thermal crack, please abide by the precautions for application mentioned by this firm".

② "Affixing to rough surface of frosted glass may cause the blistering of film".

③ "Avoid applicating to organic glasses as it causes blistering of film".

(2) Methods of mending and preservation

Examples: ① "Please see to it that the children do not scratch the film with a knife and the like".

② "When you wipe the side with film affixed, please use soft cloth".

(3) Time of replacement

Applicable Standards:

JIS B 7721-Tensile Testing Machines

JIS L 0804-Grey Scale for Assessing Change in Colour

JIS R 3106-Testing Method on Transmittance and Reflectance for Daylight and Solar Radiation and Solar Heat Grain Coefficient of Flat Glass

JIS R 3202-Float and Polished Plate Glasses

JIS Z 0237-Testing Methods of Pressure Sensitive Adhesive Tapes and Sheets

JIS Z 8720-Standard Illuminants and Sources for Colorimetry

JIS Z 8730-Method for Specification of Colour Differences for Opaque Materials

JIS Z 8902-Xenon Standard White Light Source

Reference Standard:

JIS Z 8202-Quantity Symbols, Unit Symbols and Chemical Symbols

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